Smaller and More Rural Hospitals have Worse Outcomes in Aortic Dissection Management

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Background

Aortic dissection is a life-altering, and sometimes life-threatening, condition requiring multi-disciplinary and comprehensive care.

Over the past 30 years in the U.S., hospitals have increasingly become incorporated into hospital systems

- This increased regionalization has led to more cases being managed at large urban-teaching hospitals.

Objective: Examines trends in aortic dissection hospitalizations, management strategies, and outcomes across different hospital settings.

Methods

Data: National Inpatient Sample (NIS) from 2000-2021

- Inclusion: all patients who had ICD9/10 codes for aortic dissection in any diagnosis variable
  - ICD-9: 441.0
  - ICD-10: I71.0

Hospital Settings:

- Urban-Teaching Hospital
- Urban-Nonteaching Hospital
- Rural Hospital

Figure 1: Aortic Dissection Hospitalization Incidence with proportion of each intervention approach.

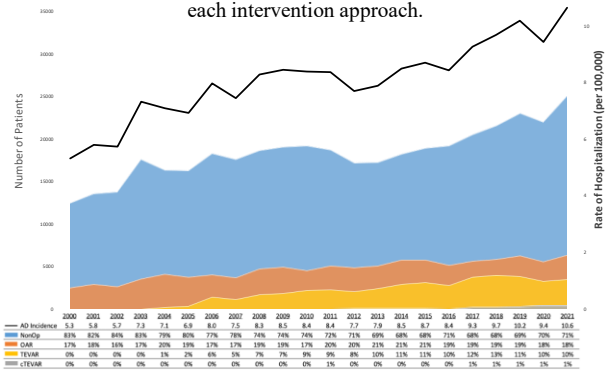
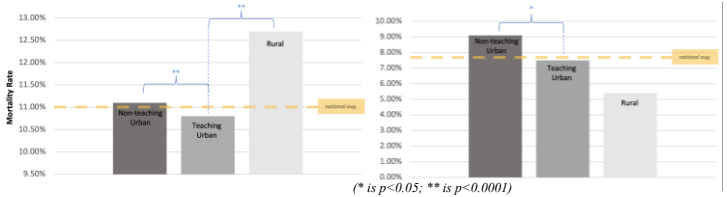


Figure 2: Mortality rate of aortic dissections by hospital setting (left) nonoperative, (right) endovascular repair.



(is p<0.05; ** is p<0.0001)*

Highlights

1. Increasing Incidence of Aortic Dissection Cases increased from 26.7/100k in 2000 to 47.2/100k in 2020 ($p<0.01$).
2. Shifts in Management Strategies
   - Nonoperative management decreased (83% in 2000 to 71% in 2021).
   - Endovascular repair increased (TEVAR in 85% of descending and 16% of ascending/arch cases by 2021).
3. Hospital Centralization Trends
   - Cases increasingly treated at urban-teaching hospitals (72% in 2000 → 92% in 2021, $p<0.01$).
   - Since 2016, urban-teaching hospitals intervened more often than rural hospitals (21% vs. 6%, $p<0.01$) despite similar medical management failure rates.

Conclusions

- Aortic dissection cases and interventions have increased significantly over the last 20 years.
- Regionalization has concentrated complex cases in high-volume centers, potentially improving outcomes.
- **Urban-teaching hospitals demonstrate superior survival rates**, supporting centralization of aortic care for high-risk vascular emergencies.
- Further research is needed to evaluate **barriers to timely transfer** and optimize triage protocols.

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